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The Evaluation Model for ICT-based Teaching in Vocational College Classrooms

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Abstract: The informatization of classroom teaching in higher vocational education has entered a stage of connotative development. The effectiveness of classroom teaching is crucial to the quality of classroom teaching and also a core requirement for the construction of "Golden Courses". Based on the need to improve the quality of ICT-based classroom teaching, this study analyzes the characteristics of effective ICT-based teaching in higher vocational classrooms by investigating the current status of ICT-based teaching in higher vocational classrooms. It attempts to construct a five-dimensional evaluation model, OTSOI, with "teacher-student" dual evaluation subjects, providing a reference for teachers' teaching, students' self-evaluation, self-diagnosis, and self-improvement, aiming to promote the quality construction of ICT-based classroom teaching in higher vocational education.

Keywords: ICT-based Teaching; Classroom Teaching; Higher Vocational Education; Golden Courses; Teaching Effectiveness

1. Introduction

The informatization of higher vocational education is an important path for developing modern vocational education and a vital lever for promoting its development. With the guidance of policies, the construction of software and hardware, the development of boutique courses, and the promotion of teaching through competitions, considerable progress has been made in the informatization construction of higher vocational courses. At the same time, the realization of talent training goals is based on curriculum construction, and the classroom is the main arena for curriculum teaching. The quality of classroom teaching is directly related to the quality of education and teaching as well as talent training. The Ministry of Education's call to "eliminate 'water courses' and create 'golden courses'" aims to effectively improve the quality of classroom teaching. In the context of accelerating the modernization of vocational education and constructing "golden courses", researching the effectiveness of ICT-based teaching in higher vocational classrooms and constructing an evaluation model for ICT-based teaching in higher vocational classrooms will help deepen the quality awareness of ICT-based classroom teaching among higher vocational teachers and is of great significance for using informatization to enhance the quality of classroom teaching.

2. Understanding the Connotation of ICT-Based Teaching Effectiveness

In the context of "ICT-based teaching effectiveness," the core connotation lies in "teaching effectiveness". "Informatization" serves as a conditional limitation for "teaching," meaning that "ICT-based teaching effectiveness" discusses the effectiveness of teaching in an ICT-based teaching environment. Although the form of teaching methods changes, the connotation of teaching effectiveness remains unchanged. Regarding the definition of the connotation of "teaching effectiveness," there are two main ideas in academia: one, represented by J.M. Border and J.H. Dorfman, focuses on whether teaching can effectively achieve the teaching objectives set by teachers, examining the achievement of teaching objectives from the perspective of teaching; the other, represented by C. Kyriacou, focuses on whether teaching can truly promote the development and progress of students, examining the learning effects of students from the perspective of learning. Similarly, some domestic scholars believe that the effectiveness of teaching depends on the results of learning, and teaching is also for the purpose of enabling students, the subjects of learning, to achieve

greater development [1-3]. Others further define the "effectiveness" of "effective teaching" as "effect, benefit, and efficiency": "effect" refers to the changes that students experience through participation in teaching, "benefit" refers to the beneficial impacts of students' learning on individuals and society, and "efficiency" refers to the ability to achieve more teaching output with less teaching input [4-5].

Admittedly, the effectiveness of teaching depends on the learning effects of students. The purpose of "teaching" is for the results of "learning." The effectiveness of teaching depends on the effects of students' knowledge acquisition, skill enhancement, and literacy improvement through participation in various teaching activities, as well as their satisfaction and sustainability with the learning process. However, the relationship between "teaching" and "learning" cannot be separated. When discussing the effectiveness of teaching, we cannot ignore the leading role of teachers in classroom teaching. Even in an ICT-based teaching environment where students are the center of classroom teaching, classroom teaching objectives must still be set by teachers, classroom teaching activities must still be designed by teachers, and teachers must also reasonably conduct evaluations of students' learning effects. Whether the results of learning are aligned with the objectives of teaching is an important manifestation of effective teaching.

Therefore, this study will investigate and analyze the current status of ICT-based teaching in higher vocational classrooms from the perspectives of both "teaching" and "learning," and explore the construction of an evaluation model for ICT-based classroom teaching based on the intrinsic requirements of "golden course" construction.

3. Investigation of the Current Status of ICT-based teaching in Higher Vocational Classrooms

To fully understand the current status of ICT-based teaching in higher vocational classrooms, this study conducted surveys among higher vocational teachers and students using methods such as questionnaires, case interviews, and field observations. The participating higher vocational students were evenly distributed across first and second grades; teachers had varying years of teaching experience and covered various professional titles. By analyzing the survey results, the following characteristics of ICT-based teaching in higher vocational classrooms were summarized:

3.1 Characteristics of Students' Classroom Learning

3.1.1Preferring to practical activities

Through classroom observations, it was found that from the perspective of classroom activity participation, higher vocational students exhibited more enthusiasm and more active classroom atmospheres when participating in practical teaching activities. In theoretical teaching classrooms, it was clearly observable that when teachers lectured on textbook knowledge points or simply presented slides, students struggled to maintain their attention on the teaching content for extended periods, resulting in extremely low teaching efficiency and learning effects for both teachers and students. When teachers interspersed interactive activities (such as group discussions, brainstorming, answering questions by raising hands or competing) during lectures, most students could promptly adjust their learning states and actively respond. Especially in online interactive teaching activities and teaching activities with a competitive element (such as competing to answer questions or group competitions), the coverage of participating students was even greater.

The results of the questionnaire survey also confirmed students' desire for practical activities, expressing a wish to do more hands-on activities in class and believing that participating in practical training projects is more helpful for future employment. Additionally, "communication" was a high-frequency word in the responses, with many students believing that teachers talk too much in class while students speak too little, resulting in a weaker sense of participation and lower learning motivation. They hoped for more opportunities for discussion and exchange among students and between students and teachers, as well as more personalized learning customization.

3.1.2 Relying on smartphones

Smartphones play an increasingly important role in the entire learning process of higher vocational students. Besides searching for learning materials and remote online learning,

smartphones are the most ubiquitous and portable ICT-based teaching terminals in the current ICT-based teaching environment of higher vocational classrooms. Smartphones of different brands and operating systems can provide a reliable installation and operating environment for various teaching software. With just one smartphone, students can participate in various online teaching activities, creating a "universal access" learning space for teachers and students in the classroom. Interactive teaching software can assist teachers in lesson preparation, classroom management, and after-class evaluation. An increasing number of teachers are using smartphones to organize diverse classroom teaching activities, energizing the classroom atmosphere and engaging students. Students participate in teaching activities in the palm-sized classroom, where everyone can fully express their opinions and share learning insights in their own learning spaces. Learning traces are naturally retained and simultaneously enable process evaluation of courses.

The dependence of higher vocational students on smartphones not only demonstrates a positive promotional effect, but smartphones are also the primary culprit in distracting students' classroom attention. Due to the age and psychological characteristics of higher vocational students, most students have weak resistance to mobile phone distractions during classroom learning. Especially after completing online teaching activities, their self-control ability to promptly disconnect from their phones and concentrate on subsequent teaching content is insufficient. Once students pick up their phones, it is difficult for them to put them down, making it impossible for them to fully invest in classroom teaching, resulting in disrupted classroom learning continuity and affecting classroom learning effects.

3.2 Characteristics of Teachers' Classroom Teaching

3.2.1 ICT-based teaching has become the norm in classrooms

With the advancement of digital and smart campus constructions, the ICT-based environment construction in vocational college classrooms has witnessed rapid progress. According to student surveys and teacher interviews, ICT-based teaching has basically achieved normalization in vocational college classrooms, ranging from public basic courses to professional skill training courses. The majority of teachers employ ICT-based teaching media in their instruction, with primary forms including: PowerPoint presentations (86.59%), mobile teaching apps (58.54%), digital campus learning platforms (52.44%), micro-lessons (41.46%), and resource libraries (41.24%). The forms are quite diverse. The most prevalent form of ICT-based teaching activities in the classroom is the organization and management of class activities based on mobile teaching apps, especially in public basic courses and theoretical teaching classes. Student class activity data extracted online can be used as a basis for process evaluation and weighted into the final learning evaluation of the course, promoting reform in course learning evaluation.

3.2.2 Insufficient connotation construction of ICT-based classroom teaching

The deficiencies in the connotation construction of ICT-based teaching are reflected in the following aspects: First, the methods of ICT-based teaching are relatively limited. Many teachers use ICT-based tools merely to comply with school requirements, without fully understanding the actual needs of ICT-based classroom teaching. Second, in terms of the application of ICT-based teaching methods, some teachers are more concerned with whether ICT tools are used rather than whether they are used appropriately. Excessively conducting unnecessary ICT-based teaching activities weakens the teaching effectiveness. Third, the form of ICT-based teaching overshadows its content. The understanding of ICT-based teaching remains superficial. While it appears to be ICT, the teaching core remains traditional, with a knowledge-imparting teaching method and philosophy. Teachers fail to fully utilize ICT tools to guide students to actively participate in the learning of knowledge and skills. Consequently, students' learning behaviors and learning outcomes do not improve significantly in the ICT-based teaching environment.

4. Construction and Application of the Evaluation Model for ICT-based Teaching in Vocational College Classrooms

4.1 Thoughts of the Model Construction

4.1.1 Origining from the “golden courses”

The research on the effectiveness of ICT-based classroom teaching in vocational education is grounded in the construction of vocational education curricula. In recent years, vocational education has placed significant emphasis on curriculum development, with "golden courses" emerging as a vital task within the "Five Gold" construction initiative aimed at promoting high-quality development in vocational education. The positioning of "golden courses" can be traced back to the task requirements of the "Three-Teaching Reform" (teachers, teaching materials, and teaching methods) outlined in the 2019 "National Vocational Education Reform Implementation Plan," which laid the foundation for creating high-quality vocational education courses (i.e., "golden courses") through innovative teaching methodologies. The 2020 "Action Plan for Improving and Enhancing the Quality of Vocational Education (2020-2023)" proposed a series of measures, including optimizing professional layouts, strengthening the construction of practical training bases, enhancing the quality of teaching staff, and advancing curriculum and textbook reforms, with the aim of comprehensively elevating the quality of vocational education. These measures constitute integral parts of "golden course" construction and contribute to the creation of high-quality vocational education curricula. The "Opinions on Promoting the High-Quality Development of Modern Vocational Education" underscore the importance of modern vocational education and advocate for strengthening the construction of vocational education systems, deepening educational and teaching reforms, and improving the quality of talent cultivation. The educational and teaching reforms and talent cultivation quality improvement concepts advocated in this document serve as crucial goals and directions for "golden course" construction.

Experts in the field of vocational education have continuously conducted multifaceted research on "golden courses." The characteristics of "golden courses" summarized by experts include: firstly, the integration of ideological and political education, which emphasizes the incorporation of ideological and political education within the curriculum to achieve value guidance and align with the educational objective of cultivating virtue through education. Secondly, market orientation, which means that course content should be closely aligned with industry trends and meet the demands of the industry in a timely manner. Thirdly, the integration of theory and practice, which adheres to a competency-based approach by integrating professional theory and skills training to cultivate students' vocational abilities and transferability. Fourthly, multidimensional interaction, which facilitates exchanges between teachers and students, as well as among students, through various online and offline interactive methods to stimulate intellectual collisions and foster intellectual development. Fifthly, precision implementation, which utilizes technological means to precisely record and analyze students' learning processes, thereby enabling personalized teaching [6-7].

The implementation strategies for constructing "golden courses" can be summarized as follows: Firstly, in terms of curriculum content and teaching methods, course content should be promptly updated in accordance with industrial development needs, incorporating new methods, technologies, processes, and standards. Meanwhile, diversified teaching methods such as project-based learning, case studies, and work-process-oriented teaching should be adopted to enhance teaching effectiveness. Secondly, from the perspective of teaching resources and technological application, modern information technology should be leveraged to integrate high-quality teaching resources, digitize and network course content, and facilitate teacher-student and student-student interaction through online teaching platforms, thereby enhancing learning engagement and effectiveness. Thirdly, concerning the evaluation system and feedback mechanism, a diversified evaluation system should be established to comprehensively assess students' learning outcomes, process performance, and innovative abilities. Additionally, timely collection of student feedback and adjustment of teaching content and methods based on this feedback are essential to ensure teaching quality [8-10].

4.1.2 Furthering in the thoughts

Distinguished from traditional classrooms, an effective ICT-based "golden course" classroom

should possess the following six characteristics:
(1) The teaching objectives should be based on cooperative and inquiry-based learning rather than lecture-based understanding.
(2) Students should achieve the learning objectives in a cooperative and inquiry-based learning environment and complete various tasks to achieve these objectives under teacher guidance.
(3) Teamwork and learning reflection can be effectively promoted.
(4) The classroom learning environment is not limited to the classroom. Students can communicate and study together with experts and other learners outside the classroom.
(5) Teachers and students use appropriate technological means to support the conduct of teaching activities and connect with the outside of the classroom.
(6) Students' learning evaluation focuses on their actual participation in teaching activities rather than merely assessing cognitive knowledge, emphasizing process evaluation.

4.2 Evaluation Model Construction

Combining the current research on ICT-based teaching in vocational college classrooms with the goal-oriented construction of "golden courses," an OTSOI five-dimensional teaching evaluation model with "teacher-student" dual evaluation subjects is constructed based on the widely adopted IEA teaching evaluation framework (Table 1).

Table 1. OTSOI Five-Dimensional Teaching Evaluation Model

Evaluation Dimension	1	2	3	4	5
Objective	Knowledge objectives are prominent, but skill objectives are unclear.	Knowledge and skill objectives are clear and evaluable.	Knowledge, skill, and literacy objectives are clear and evaluable; they match students' learning abilities.	Knowledge, skill, and literacy objectives are clear and match job requirements and students' learning abilities.	Besides knowledge, skill, and literacy objectives, personalized teaching objectives are set based on students' learning differences.
Teacher's Role	Can organize the conduct of teaching activities, complete process guidance, and reasonable evaluation.	Highlights students' subject status in teaching organization, with appropriate guidance and leading.	Teaching organization is not limited to a single form; student participation and feedback are emphasized during the teaching process.	The time allocation of teaching segments is reasonable, theory and practice are appropriately combined, and key and difficult points are highlighted.	Designs and organizes teaching activities covering typical work tasks; introduces enterprise experts/teaching teams to complete teaching tasks.
Student's Role	Attends lectures throughout.	Actively searches for knowledge; actively participates in group activities.	High participation and enthusiasm in teaching activities; quick response to questions.	High learning subjectivity; high-quality completion of learning tasks; high degree of cooperative learning (including remote cooperative learning).	Sets learning tasks based on personal learning progress, designs learning plans independently and completes them; can provide guidance and help to classmates and teachers; reflects on learning content.
Outcome of Learning	Most students successfully complete learning tasks.	Most students pass exams and skill assessments.	Group learning outcomes: project reports, group presentations, etc.; individual learning outcomes: online learning portfolios.	Research-based learning outcomes: solutions to practical problems.	Reaches or exceeds personalized learning objectives; students have a high sense of achievement.
ICT used	No information technology application.	Mainly uses auxiliary lecture slides, search engines, and other conventional technologies.	Reasonably applies ICT-based teaching methods and technologies such as shared teaching resources and mobile teaching apps to conduct teaching activities.	Classroom teaching resources are abundant, and technological means are applied reasonably, promoting classroom and remote cooperative teaching.	Appropriately selects virtual simulation, artificial intelligence, and other technologies for teaching; applies big data technology to conduct classroom management and teaching behavior analysis.

4.3 Interpretation of Evaluation Model Indicators

4.3.1 Evaluation dimensions

The evaluation model includes five dimensions: objective setting, teacher's role, student's role, learning outcome, and ICT application. The evaluation model is oriented by teaching

objectives, observing and evaluating teachers' and students' teaching and learning behaviors in classroom teaching and the presentation of students' learning outcomes, supplemented by considering the application of ICT-based teaching methods, to comprehensively assess the effectiveness of ICT-based classroom teaching.

4.3.2 Evaluation strategy

The model takes teachers, the dominant force in classroom teaching, and students, the center of teaching activities, as the evaluation subjects. It evaluates the OTSOI five dimensions of classroom teaching from the perspective of both teachers and students, selecting the most relevant value for each dimension based on actual classroom teaching.

4.3.3 Evaluation model as a carrier for teacher and student self-evaluation

The model provides a carrier for teachers to self-evaluate and reflect on their teaching gains and losses, adjust teaching objectives and designs, improve teaching methods, and enhance teaching effectiveness. Students can also self-evaluate their learning processes, methods, and outcomes, reflect on and improve their learning methods, and continuously enhance their knowledge acquisition and skill training efficiency.

5. Conclusion

The research constructs a five-dimensional teaching evaluation model OTSOI, with "teachers and students" as the dual evaluation subjects, based on a survey of the current situation and a review of theoretical policies. In subsequent research, empirical studies on the theoretical model should be further conducted to refine and elaborate on the evaluation indicators, with the aim of enhancing the effectiveness of information-based teaching in higher vocational classrooms.

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